Roller Coasters—Initial Hill—Nonattending Students
Ground Measurements

Use the following data from a coaster that has an initial hill that can be measured using the estimation techniques you are familiar with.

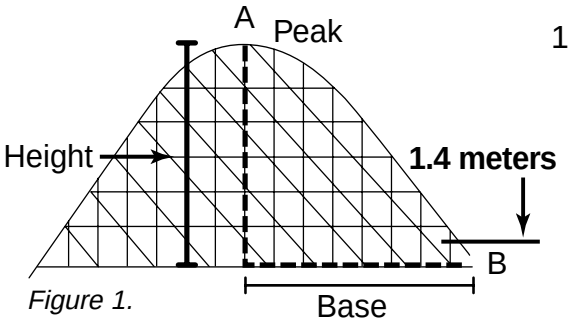

Figure 1.

1. Estimate the height of the first hill from the ground by using the design of the structures. See the Basic Skills section (page 31) if you have forgotten how to do it. Show your work below.

Eye level height = 1.4 meters,
fractional part = 8/10, number of structures = six

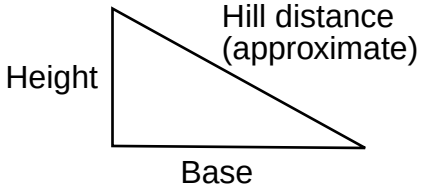

Figure 2.

2. Find the base length of the hill by stepping (see fig. 1).

Stepping distance is 30 meters = 39 steps
the base of the hill = 32 steps

3. Calculate the approximate hill distance by using the Pythagorean theorem. (Note, this is an approximation of the distance down the first hill because the track is curved at the top and bottom.) Show your work.

$(\text{base}^2 + \text{height}^2 = \text{hill distance}^2)$

4. Time the roller coaster going down the first hill from point A to point B as shown in figure 1. Do this three times and fill in the data table below.

5. Calculate the average speed of the cars down the first hill. First find the average time of your three trials, and then calculate (s = d/t). Fill in data table below.

	Time trial 1	Time trial 2	Time trial 3	Average time, s	Distance, m	Speed, m/s
From A to B	**3.0 s**	**2.6 s**	**2.8 s**			